

NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



THESIS

**AN ANALYSIS OF THE CRITERIA REQUIRED
TO IMPLEMENT A STOCKLESS INVENTORY
PROGRAM AT NAVAL HOSPITALS**

by

William R. Gaither

December, 1995

Thesis Advisor:

James A. Scaramozzino

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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 1995 December	3. REPORT TYPE AND DATES COVERED Master's Thesis		
4. TITLE AND SUBTITLE AN ANALYSIS OF THE CRITERIA REQUIRED TO IMPLEMENT A STOCKLESS INVENTORY PROGRAM AT NAVAL HOSPITALS		5. FUNDING NUMBERS		
6. AUTHOR(S) William R. Gaither				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000		8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER		
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.		12b. DISTRIBUTION CODE		
13. ABSTRACT (maximum 200 words) <p>The purpose of this research was to identify criteria which could be considered prior to implementation of a stockless inventory program at Naval Hospitals within the Continental United States. A stockless inventory program for the purposes of this thesis one in which a private Contractor provides comprehensive inventory services to include those functions performed by the personnel in the Materials Management Department as well as those performed by the individual departmental Supply clerks.</p> <p>The author examines the criteria used by civilian hospitals and then validates that criteria through structured interviews with Material Managers at CONUS-based Naval Hospitals. In addition, the author discusses potential reductions in FTEs within the Materials Management Department.</p>				
14. SUBJECT TERMS Just-In-Time, JIT, Stockless Inventory		15. NUMBER OF PAGES 80		
		16. PRICE CODE		
17. SECURITY CLASSIFI- CATION OF REPORT Unclassified	18. SECURITY CLASSIFI- CATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICA- TION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

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A STOCKLESS INVENTORY PROGRAM AT NAVAL HOSPITALS**

William R. Gaither
Lieutenant, Medical Service Corps,
United States Navy
B.S., National University, 1990

Submitted in partial fulfillment
of the requirements for the degree of

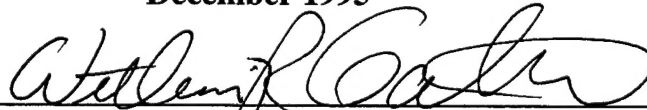
MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

December 1995

Author:

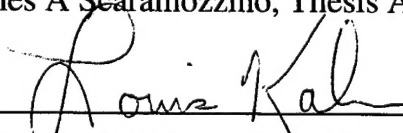


William R. Gaither

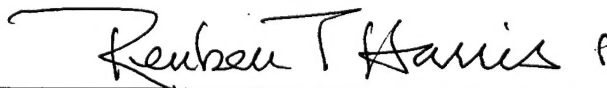
Approved by:



James A. Scaramozzino, Thesis Advisor



Louis G. Kalmar, Second Reader



Reubin T. Harris, Chairman
Department of Systems Management

ABSTRACT

The purpose of this research was to identify criteria which could be considered prior to implementation of a stockless inventory program at Naval Hospitals within the Continental United States. A stockless inventory program for the purposes of this thesis one in which a private Contractor provides comprehensive inventory services to include those functions performed by the personnel in the Materials Management Department as well as those performed by the individual departmental Supply clerks.

The author examines the criteria used by civilian hospitals and then validates that criteria through structured interviews with Material Managers at CONUS-based Naval Hospitals. In addition, the author discusses potential reductions in FTEs within the Materials Management Department.

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I. INTRODUCTION

A. OVERVIEW

As the Navy medical department continues to "right-size" and the Total Health Care Support Readiness Requirement (THCSRR) model is implemented¹, Navy Medicine continues its shift towards managed care, resulting in CONUS-based Naval Hospitals having to do more with less personnel and financial resources. In addition to the reduction in active duty personnel, Navy Medicine also faces potential cuts in Civil Service personnel by as much as twenty-two percent [Martin, 1995].

Given this environment of personnel reductions and decreasing operating funds, controlling hospital expenditures through an aggressive approach of inventory management is one of the best opportunities available at the individual Naval Hospital.

With price differentiation becoming minimal among different suppliers, provider organizations are finding that the only cost savings to be gained are through the cost-effective use of technologies, products and services intended to streamline the supply chain. [Taylor, 1994]

In the past few years there has been a trend within Navy Medicine, especially at CONUS-based Naval Hospitals, to adopt civilian hospital business practices. Even though Naval Hospitals are not in business to make a profit, they can use civilian business practices to streamline hospital inventory procedures and control costs, while at the same time, providing even better service to their beneficiaries.

¹This model is discussed in greater detail in Chapter II.

Within the past few years, medical material managers have seen the implementation of Electronic Data Interchange (EDI) programs implemented through the Defense Logistics Agency (DLA) and the Prime Vendor program which has greatly reduced the pharmaceutical inventories held at various Naval Hospitals and has been expanded to include medical/surgical supplies. Implementing a stockless inventory program, given the success of the Prime Vendor program, is a logical step, and has the potential for further cost savings by reducing or redistributing personnel within the Materials Management Department, reducing official inventories and eliminating the need for unofficial inventories kept in the various departments.

B. OBJECTIVE

The objective of this research is to determine if the criteria used to implement a stockless inventory program in the civilian sector is applicable to Naval Hospitals, determine if Naval Hospitals currently meet the criteria required for implementing stockless inventory programs, and identify the expected impact of a stockless inventory program on the personnel requirements within the Materials Management Department.

C. RESEARCH QUESTIONS

The questions examined are as follows:

- 1) Is criteria used implement stockless inventory programs at civilian hospitals applicable to Naval Hospitals?
- 2) Do Naval Hospitals currently meet the civilian sector criteria for implementing a stockless inventory program?

3) What effect will a stockless inventory program have on personnel requirements within the Warehousing/Inventory Control, Central Processing and Distribution (CPD), Purchasing, and Receipts Control divisions of the Materials Management department?

D. SCOPE

This thesis is intended to supply any CONUS-based Naval Hospital considering implementation of a stockless inventory program with relevant background information. The reader will have an understanding of the benefits of a stockless inventory program, the criteria that should be considered before implementing a stockless inventory program and the limitations of a stockless inventory program.

This thesis is not intended to be an implementation guide, nor is it intended to be a definitive reference on stockless inventory programs.

E. METHODOLOGY

During the course of this research, the author reviewed the applicable literature to ascertain the current views of subject matter experts on stockless inventory programs within the civilian medical community. A set of criteria for implementing a stockless inventory program was synthesized from the literature review and used to develop an operational definition to conduct structured interviews with Material Managers stationed at CONUS-based Naval Hospitals. The author selected Medical Service Corps Officers currently filling positions as the Head of the Material Management Departments at thirteen CONUS-based Naval Hospitals which were chosen to provide a representative sample of large, medium, and small hospitals. A copy of the questions asked during the

interview is located in the Appendix. Once the interviews were completed, the results were analyzed to determine:

- If the criteria identified as essential for implementing a stockless inventory program at civilian hospitals are applicable to Naval Hospitals,
- To what degree are those requirements currently present at Naval Hospitals, and
- The potential impacts on personnel reductions within the Material Management Department.

F. BENEFITS OF RESEARCH

The DoD and the Navy Medical Department can derive several benefits from this research. First, this research identifies the criteria Naval Hospitals may want to consider before implementing a stockless inventory so as to maximize the benefits which can be realized from implementing a stockless inventory program as well as avoid the limitations associated with it. Second, this research introduces the reader to the Total Health Care Support Readiness Requirement (THCSRR) and presents the stockless inventory program as a mechanism to ensure supply services are not disrupted during periods of mobilization.

G. ORGANIZATION OF RESEARCH

The remaining chapters in this thesis are organized as follows:

Chapter II (Background): Presents an overview of the benefits of a stockless inventory program, the criteria for successful implementation of stockless inventory programs in the civilian sector, limitations of stockless inventory programs, and compares various inventory programs (i.e. traditional, JIT and Stockless). In addition, the

organization of a typical Materials Management Department, the THCSRR model and medical personnel allocation priorities are also discussed.

Chapter III presents the results of the data collected during the structured interviews and presents the information in three formats, 1) Whole population sample, 2) the sample grouped by years of experience, and 3) the sample grouped by hospital size.

Chapter IV analyzes the results of the interviews as they relate to the research questions: "Is criteria used to implement stockless inventory programs at civilian hospitals applicable to Naval Hospitals?"; "Do Naval Hospitals currently meet the criteria for implementing a stockless inventory program?"; and "What effect will a stockless inventory program have on personnel requirements within the Warehousing/Inventory Control, Central Processing and Distribution (CPD), Purchasing, and Receipts Control divisions of the Materials Management Department"

Chapter V makes conclusions and provides recommendations concerning stockless inventory programs in Naval Hospitals.

II. BACKGROUND

A. CHAPTER INTRODUCTION

This chapter presents an overview of some of the benefits of a stockless inventory program, the criteria required for successful implementation of a stockless program, limitations of stockless inventory programs, the organization of the Materials Management Department, and THCSRR model and its importance.

B. BENEFITS OF A STOCKLESS INVENTORY PROGRAM

In addition to the potential reduction in costs, other benefits of a stockless inventory program include:

- Allows reassignment of personnel displaced by reductions in FTEs, to other division of the Materials Management Department or direct patient care areas.
- Reduction in warehousing and distribution personnel which results in reductions in payroll as well as fringe benefits.
- Reduced inventory, freeing-up funds, which can be used more efficiently and reduces waste due to expired shelf-life items.
- Increases space within the facility since the unused warehouse space can be converted into administrative or patient care areas.
- Increases in customer service levels (historical fill-rates have been in the 98 to 99 percent range).

C. CRITERIA FOR SUCCESS

For civilian hospitals that find it appropriate and cost effective to pursue stockless programs, consistent criteria for successful application have emerged. Kowalski and Dickow have identified the following criteria for success:

- Enlightened commitment from the hospital administration. Meaning the leadership endorses innovative programs and is committed to ensuring their success.
- A well-organized and smoothly operating supply system. If the Materials Management Department is not currently meeting the needs of the hospital and suffers from a lack of organization, a stockless inventory program will not eliminate the fundamental problems within the department and will probably fail in a relatively short period of time.
- Cooperation based on mutual respect and trust between the contractor and materials management personnel.
- An enhanced computerized information system both internally with supported departments and between materials management and the vendor(s).
- The vendor must be located close enough to the hospital to efficiently and effectively support the hospital with routine and frequent deliveries.
- A management mechanism based on measurable performance indicators that are identified before the contract is signed. That is, an active and continuous program of performance measurement and quality improvement programs are needed to ensure continuous improvement in the system.
- Backup/continency systems that will accommodate breakdowns in the Contractor's supply distribution system that can be expected to occur.
- Adequate compensation to the supplier based on meaningful and measurable formulas, such as product cost plus an acceptable service fee.
- Product conversion in order to utilize the distributor of choice. These are likely to be necessary because the distributor may not be able to obtain specific items for specific vendors. Conversion is not easy and requires active participation by the user departments (i.e. physicians, nurses, etc.).

D. LIMITATIONS OF STOCKLESS INVENTORY PROGRAMS

Kowalski and Dickow identified the following as some of the typical limitations of stockless inventory programs:

- Stockless programs do not handle all products, at least not to date. This requires the Naval Hospital to maintain a separate system for purchasing nonstock items.
- Stockless programs may not affect total supply expenditures. Consumption usually does not change, therefore the unit price may not change unless a lower price can be negotiated with the vendor.
- Stockless programs do not eliminate the need for a materials manager and/or materials management staff. A stockless system may reduce the requirement for warehouse and distribution personnel, however, due to the increase in invoices, there may be a need for more Receipts Control and fiscal personnel.
- Stockless programs are not free. Although the hospital may reduce the costs of staff, inventory and space, a typical result is to shift resources and costs from the hospital to the supplier (the contractor for the services). Service fees have reportedly ranged from 3 to 13 percent of the cost of the products purchased (on a cost plus basis). It is critical to ensure that the hospital's total costs, including service fees, are less with the stockless program than without it.
- Stockless programs dramatically change how hospitals manage their supply system since the vendor provides the services that the hospital used to provide for itself. A stockless program requires greater discipline than hospitals may have exercised in the past. More attention to operational details and the system as a whole is required or the system is doomed to fail.

E. VARIATIONS OF INVENTORY PROGRAMS

Traditional inventory programs used by hospitals typically involve the use of many suppliers, warehouse/inventory control personnel, buyers and large supply distribution systems (i.e. Receiving, intermediate hold areas, repackaging, distribution, re-stocking, etc.) all managed internally by the Materials Management Department.

DoD Hospitals currently use a modified version of a JIT inventory program known as the Prime Vendor Program (PVP). This program divides the nation into 22 geographic regions. Within each region, two “Prime Vendor” contracts are awarded: one for pharmaceutical supplies and the other for medical/surgical supplies. The prime vendors are the primary source of consumable medical supplies for each DoD Hospital within their respective geographic regions [Capano, 1994]. Just-in-time (JIT) simply means that supplies and parts are ordered to arrive just before they are actually needed for use. Thus, frequent deliveries are made directly to the point of use and virtually no inventories are maintained in a warehouse, stockroom, or on the shop floor. Hospitals have taken the basic principals of JIT and developed what is called a stockless approach. Essentially, stockless means obtaining supplies in small units of packaging or quantities ready to be taken to the user department shortly before they are needed. In a stockless system, there is virtually no storeroom (space, inventory, or staff) because this service is contracted to the supply distributor who’s employees, distribute and stock the supplies in the user departments. This system dramatically reduces the need for warehouse and distribution personnel. Table 2.2 is a comparison of the traditional, JIT and stockless models and identifies some of the similarities and differences between the three systems. [Kowalski-Dickow, 1993, pp 223-224] .

Table 2.1**Supply Chain Models**

Component	Traditional	JIT	Stockless
Number of suppliers of medical/surgical stock items	15 - 150	4 - 20	1 - 2
Percentage of supply budget involved	100%	65 - 85%	30 - 40%
Inventory echelons	Stores, CPD and user departments	Stores, CPD and user departments	Stat stores and user departments
Storeroom inventory levels (days on hand)	30 - 50	5 - 10	2 - 3
Overall inventory (days on hand)	40 - 80	N/A	N/A
Storeroom storage space	3 - 10,000 square feet	2 - 5,000 square feet	500 - 1,000 square feet
Supplier delivery: Frequency Units Methods Fill rates	1 per week Bulk Pallet and overpack 92%	3-5 per week Bulk/small Pallet and overpack 95-97%	7 or more per week Small Pick and pack 98-99%
Hospital distribution	Par/exchange Bulk Stat Nonstocks	Par/exchange Bulk Stat Nonstocks	Par/exchange Bulk Stat Nonstocks
Receiving	Total	Total	Nonstock only
Medical staff involvement	Specify use and products	Specify use and products	Deliver, pick and pack Specify and use products Receive and inspect, pick and pack deliveries
Supplier invoices (volume of lines)	350 per week	1,800 per week	1,500 per week

[Kowalski-Dickow, 1993, p. 224]

F. ORGANIZATION OF MATERIALS MANAGEMENT DEPARTMENT

The Materials Management Department is responsible for the development, maintenance and coordination of all supply support systems used throughout the Naval Hospital. A typical Materials Management Department consists of Purchasing and Contracting, Receipts Control, Linen Management, Central Processing and Distribution, Biomedical Engineering and Warehousing Divisions (Figure 2.1). Although these are the typical divisions, different facilities may include other functions under the auspices of the Material Management Department such as Food Service, Mail Distribution, Patient Transportation, Facilities Maintenance, etcetera.

1. Purchasing and Contracting Division

The Purchasing and Contracting division is responsible for purchasing all supplies, equipment and services used within the facility. This includes all stocked (inventory supplies), non-stocked (items ordered on an as needed basis by individual departments for direct delivery), major and minor equipment, parts, accessories and services. It is also responsible for negotiating all contracts for goods and services as well as providing product and pricing information to supported departments. Purchasing Agents are the only personnel authorized to commit funds on behalf on the facility and in the case of a government Naval Hospital, only warranted Contracting Officers are authorized to obligate funds on behalf of the Federal Government.

2. Receipts Control Division

The Receipts Control division is responsible certifying vendor invoices and submitting them to the finance department for payment. At government facilities, the

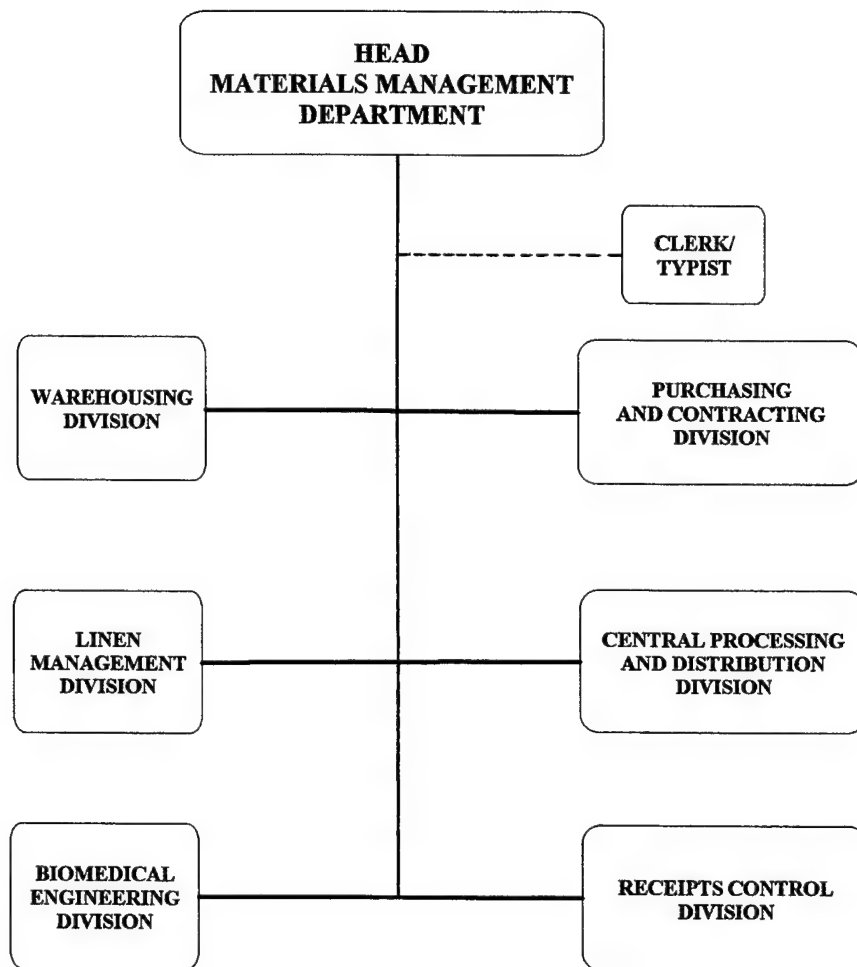


Figure 2.1 Typical Materials Management Organization Chart

certified invoices are mailed to the appropriate Authorized Accounting Activity (AAA) for payment to the vendor.

3. Warehouse Division

The Warehouse Division is responsible for receipt, storage and distribution of all supplies and equipment procured by the Naval Hospital. This division typically consists of the following areas:

- **Receiving:** Receives all supplies and equipment and conducts receiving inspections to ensure all items match the purchase order and no damage has occurred in transit.
- **Inventory Control:** Ensures all supplies are properly stored, rotated and appropriate levels of inventory are maintained.
- **Distribution:** Delivers all non-stocked supplies and equipment (also known as Direct Turn Over), in addition to all stocked items whether it is through the use of the following systems:
 - **Exchange cart:** A supply distribution method that uses a mobile cart as the storage and material-handling module. A predetermined quantity (par level) of a variety of supplies is maintained on carts by materials management personnel. The quantities are determined based on frequency of restocking and the expected usage during restocking time interval. At restocking time, the cart maintained in the user department is exchanged with a duplicate (twin) cart that is delivered by materials management. The "used" cart is returned to materials management for counting and restocking. This can be done daily, several times a day, several times a week, or as needed [Kowalski, 1990, p. xv].
 - **Par restock:** A supply distribution process that is very similar to the exchange cart system. Predetermined quantities of supplies maintained in user departments are established based on expected usage and restocking frequency (time interval). Inventory levels in user departments can be maintained on carts, in shelves and in closets. Counting of levels on hand can be completed by user department personnel or materials management personnel. Frequency can be several times a day, daily, several times a week or weekly. If a par level of 10 for a given item is established, when the levels are checked and 4

remain, 6 are provided to bring the quantity on hand in the user department “up to par” [Kowalski, 1990, p. xvi].

- Push-type: A supply distribution method where a specific number of items are delivered on a routine basis. For example, if a user department sets a level of 10 for an item to be delivered daily, the materials management department will deliver 10 items on a daily basis regardless on the quantity on hand in the user department.

4. Central Processing and Distribution Division

The Central Processing and Distribution (CPD) division is generally responsible for maintaining sterile supplies and medical instruments for use in specialized packs (i.e. minor surgery, laparoscopy, cardiac catheterization, etc.) and cleaning and sterilizing contaminated instruments used throughout the facility.

5. Biomedical Engineering Division

The Biomedical Engineering division is responsible for providing organizational level corrective maintenance for medical equipment, conducting routine preventive maintenance for all medical equipment and administering the equipment management program for all major and minor property used throughout the facility.

6. Linen Management Division

The Linen Management division is responsible for distributing linen throughout the hospital, the linen inventory control program and ensuring that the linens are correctly washed and sanitized through the in-house laundry or a commercial laundry service.

G. OVERVIEW OF THE TOTAL HEALTH CARE SUPPORT READINESS REQUIREMENT (THCSRR) MODEL

1. THCSRR

The THCSRR is a zero-based analysis of medical personnel requirements which is directly linked to the mission of the Navy. The model identifies the minimum number of medical personnel necessary to meet wartime, day-to-day operational and sustainment requirements.

Wartime requirements include medical support for two simultaneous Major Regional Conflicts (MRCs), two hospital ships and six Fleet Hospitals.

Day-to-day operational requirements include support to the fleet, Fleet Marine Force (FMF), overseas-based Naval Hospitals, isolated CONUS-based hospitals and maintaining personnel for rotational purposes (i.e. transferring from overseas to CONUS-based hospitals).

Sustainment requirements include those personnel needed to support the Medical Operation Support Requirement (MOSR) to provide replacements due to attrition and for personnel in training programs.

Table 2.1 illustrates the current THCSRR requirements. The reader should be aware that this is a dynamic model and as such, is subject to change as the force structure changes.

Table 2.2**THCSRR Model**

	MOSR	Sustainment	THCSRR
Medical Corps	2340	1377	3717
Dental Corps	1236	55	1291
Medical Service Corps	2119	409	2528
Nurse Corps	2698	293	2991
Total Officer	8393	2134	10527
Hospital Corpsmen	25101	1545	26555
Dental Technicians	2854	196	3050
Total Enlisted	27864	1741	29605
Total Personnel	36257	3875	40132

*Reprinted from a slide prepared by LCDR Scott Foster, MSC, USN, Office of the Surgeon General (N931)

2. Personnel Allocation Priorities

Medical personnel are detailed based on the following priorities (listed in descending order of priority):

- Fleet and Fleet Marine Force (FMF) units
- Isolated Conus and overseas Naval Hospitals
- Headquarters and support activities
- Primary centers of Operational Missions and Medical Training (NNMC Bethesda, NMC San Diego, NMC Portsmouth)
- Primary centers of fleet and FMF training (NH Bremerton, NH Jacksonville, NH Camp Pendleton, NH Camp Lejeune)
- All other mission support hospitals and activities.

3. Why the THCSRR model is important?

The THCSRR model is important for “right-sizing” the Navy Medical Department. With less active duty personnel and potential cuts in the Civil Service workforce, the facilities with lower allocation priorities will have to look for innovative ways to meet their mission requirements. All material managers need to familiarize themselves with the personnel requirements specified in the THCSRR model and proposed personnel reductions to determine the impact on personnel at their respective facilities. Material managers need to plan now, for future personnel reductions as the THCSRR fully implemented by Fiscal Year 1999.

In addition, it is important to realize that since the THCSRR is tied to the “operational” requirements of the Navy, selected personnel within the hospital and in some cases (i.e., a Fleet Hospital mobilization), the main cadre of hospital staff may be deployed. Material Managers need to be aware of this fact and plan accordingly to minimize interruption of supply services throughout the hospital.

H. CHAPTER SUMMARY

In this chapter, we have discussed some benefits of a stockless inventory program, the criteria required for successful implementation of a stockless program, limitations of stockless inventory programs, the organization of the Materials Management Department, and THCSRR model and its importance.

III. DATA ANALYSIS

A. CHAPTER INTRODUCTION

This chapter presents an analysis of the data collected through the structured interviews and is presented in three formats, 1) Whole population sample, 2) the sample grouped by years of experience, and 3) the sample grouped by hospital size.

B. DEMOGRAPHICS

The structured interviews were conducted with Medical Service Corps officers currently serving as Department Heads of the Material Management Departments at 13 CONUS-based Naval Hospitals. Among the 13 hospitals, two were large, five were medium and six were small, representing 67 percent of the large, 57 percent of the medium and 60 percent of the small CONUS-based hospitals. The respondents' ranks and years of experience in the Materials Management or Logistics fields are listed in Table 3.1.

Table 3.1

HOSPITAL SIZE	RANK	YEARS OF EXPERIENCE	HOSPITAL SIZE	RANK	YEARS OF EXPERIENCE
Large	CDR	20	Small	LT	9
Large	CDR	20	Medium	LT	8
Medium	LCDR	4	Medium	LT	8
Medium	LCDR	2	Small	LT	7
Small	LT	21	Small	LT	6
Medium	LT	9	Small	ENS	6 Months
Small	LT	9			

C. DATA ANALYSIS OF THE WHOLE POPULATION SAMPLED

To perform the data analysis, each criterion was divided into two parts. First, the respondents were asked to decide if the criterion is relevant to implementing a stockless inventory program at a Naval Hospital. Second, the respondents were asked to determine the degree the criteria are currently present at their respective Naval Hospitals.

- Criterion 1: Endorsement of innovative programs by the Naval Hospital leadership.

- a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

- b. Currently present:

- 92% - agree or strongly agree
 - 8% - disagree or strongly disagree

- Criterion 2: A command-wide supply distribution system that is responsive to customer needs.

- a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

- b. Currently present:

- 62% - agree or strongly agree
 - 23% - neither agree nor disagree
 - 15% - disagree or strongly disagree

●Criterion 3: There is a good working relationship between the contractor and Materials Management personnel.

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 85% - agree or strongly agree
- 8.5% - neither agree nor disagree
- 8.5% - disagree or strongly disagree

●Criterion 4: The Materials Management department has a computerized information system capable of accessing workload reports of internal customers.

a. Applicable to Naval Hospitals:

- 77% - agree or strongly agree
- 8% - neither agree nor disagree
- 15% - disagree or strongly disagree

b. Currently present:

- 31% - agree or strongly agree
- 8% - neither agree nor disagree
- 61% - disagree or strongly disagree

●Criterion 5: There is a computerized information system linking the Materials Management department with the Contractor.

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 85% - agree or strongly agree
- 15% - neither agree nor disagree

- Criterion 6: The Contractor is timely in providing required reports, regarding usage rates, cost and pricing data.

a. Applicable to Naval Hospitals:

- 77% - agree or strongly agree
- 23% - neither agree nor disagree

b. Currently present:

- 54% - agree or strongly agree
- 38% - neither agree nor disagree
- 8% - disagree or strongly disagree

- Criterion 7: The Contractor is located close enough so that emergency orders can be delivered within 2 hours.

a. Applicable to Naval Hospitals:

- 85% - agree or strongly agree
- 7.5% - neither agree nor disagree
- 7.5% - disagree or strongly disagree

b. Currently present:

- 38% - agree or strongly agree
- 62% - disagree or strongly disagree

- Criterion 8: There is a system in place to monitor the Contractor's compliance with the terms of the contract.

- a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

- b. Currently present:

- 77% - agree or strongly agree
 - 15% - neither agree nor disagree
 - 8% - disagree or strongly disagree

- Criterion 9: There is a backup/contingency system in place to accommodate breakdowns in the Contractor's delivery system.

- a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

- b. Currently present:

- 69% - agree or strongly disagree
 - 15.5% - neither agree nor disagree
 - 15.5% - disagree or strongly agree

- Criterion 10: If a stockless inventory program is implemented at your command, to what degree would implementation have on Full Time Equivalents (FTEs) within the Materials Management Department?

- a. Warehousing/Inventory Control:

- 17% - slight decrease
 - 25% - moderate decrease
 - 58% - significant decrease

b. Central Processing and Distribution:

- 17% - no impact
- 25% - slight decrease
- 17% - moderate decrease
- 41% - significant decrease

c. Purchasing and Contracting:

- 17% - no impact
- 25% - slight decrease
- 41% - moderate decrease
- 17% - slight increase

d. Receipts Control:

- 17% - no impact
- 33% - slight decrease
- 17% - moderate decrease
- 17% - significant decrease
- 8% - slight increase
- 8% - significant increase

D. DATA ANALYSIS GROUPED BY YEARS OF EXPERIENCE

For the second analysis, the respondents were grouped by years of experience in the Materials Management or Logistics fields to see how the answers varied with experience level. The respondents were grouped as follows:

- Group A: Less than five years experience (n = 3)
- Group B: Five to 15 years experience (n = 7)
- Group C: Greater than 15 years experience (n = 3)
- Criterion 1: Endorsement of innovative programs by the Naval Hospital leadership.

- Group A:

- a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

- b. Currently present:

- 100% - agree or strongly agree

- Group B:

- a. Applicable to Naval Hospitals:

- 100%- agree or strongly agree

- b. Currently present:

- 86% - agree or strongly agree

- 14% - disagree or strongly disagree

- Group C:

- a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

- b. Currently present:

- 100% - agree or strongly agree

○Criterion 2: A command-wide supply distribution system that is responsive to customer needs.

●Group A:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group B:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 43% - agree or strongly agree
- 43% - neither agree nor disagree
- 14% - disagree or strongly disagree

●Group C:

a. Applicable to Naval Hospitals:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

b. Currently present:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

○Criterion 3: There is a good working relationship between the contractor and Materials Management personnel.

●Group A:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group B:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 72% - agree or strongly agree
- 14% - neither agree nor disagree
- 14% - dis agree or strongly disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

○Criterion 4: The Materials Management department has a computerized information system capable of accessing workload reports of internal customers.

●Group A:

a. Applicable to Naval Hospitals:

- 33% - agree or strongly agree
- 67% - disagree or strongly disagree

b. Currently present:

- 100% - disagree or strongly disagree

●Group B:

a. Applicable to Naval Hospitals:

- 82% - agree or strongly agree
- 14% - neither agree nor disagree

b. Currently present:

- 29% - agree or strongly agree
- 14% - neither agree nor disagree
- 57% - disagree or strongly disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

○Criterion 5: There is a computerized information system linking the Materials Management department with the Contractor.

●Group A:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - neither agree nor disagree

●Group B:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 86% - agree or strongly agree
- 14% - neither agree nor disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

○Criterion 6: The Contractor is timely in providing required reports, regarding usage rates, cost and pricing data.

●Group A:

a. Applicable to Naval Hospitals:

- 67% - agree or strongly agree
- 33% - neither agree nor disagree

b. Currently present:

- 67% - agree or strongly agree
- 33% - neither agree nor disagree

●Group B:

a. Applicable to Naval Hospitals:

- 71% - agree or strongly agree
- 29% - neither agree nor disagree

b. Currently present:

- 43% - agree or strongly agree
- 57% - neither agree nor disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

○Criterion 7: The Contractor is located close enough so that emergency orders can be delivered within 2 hours.

●Group A:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 33% - agree or strongly agree
- 67% - disagree or strongly disagree

●Group B:

a. Applicable to Naval Hospitals:

- 71% - agree or strongly agree
- 14.5% - neither agree nor disagree
- 14.5% - disagree or strongly disagree

b. Currently present:

- 29% - agree or strongly agree
- 71% - disagree or strongly disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

○Criterion 8: There is a system in place to monitor the Contractor's compliance with the terms of the contract.

●Group A:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group B:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 57% - agree or strongly agree
- 29% - neither agree nor disagree
- 14% - disagree or strongly disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

○Criterion 9: There is a backup/contingency system in place to accommodate breakdowns in the Contractor's delivery system.

●Group A:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 34% - agree or strongly agree
- 33% - neither agree nor disagree
- 33% - disagree or strongly disagree

●Group B:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 71% - agree or strongly agree
- 14.5% - neither agree nor disagree
- 14.5% - disagree or strongly disagree

●Group C:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

○Criterion 10: If a stockless inventory program is implemented at your command, to what degree would implementation have on Full Time Equivalents (FTEs) within the Materials Management Department?

●Group A:

a. Warehousing/Inventory Control:

- 100% - significant decrease

b. Central Processing and Distribution:

- 100% - significant decrease

c. Purchasing and Contracting:

- 34% - slight decrease
- 33% - moderate decrease
- 33% - significant decrease

d. Receipts Control:

- 34% - slight decrease
- 33% - moderate decrease
- 33% - significant decrease

●Group B:

a. Warehousing/Inventory Control:

- 17% - slight decrease
- 33% - moderate decrease
- 50% - significant decrease

b. Central Processing and Distribution:

- 33% - no impact
- 17% - slight decrease
- 33% - moderate decrease
- 17% - significant decrease

c. Purchasing and Contracting:

- 17% - no impact
- 33% - slight decrease
- 33% - moderate decrease
- 17% - slight increase

d. Receipts Control:

- 34% - slight decrease
- 16.5% - moderate decrease
- 16.5% - significant decrease
- 16.5% - slight increase
- 16.5% - significant increase

●Group C:

a. Warehousing/Inventory Control:

- 34% - slight decrease
- 33% - moderate decrease
- 33% - significant decrease

b. Central Processing and Distribution:

- 67% - slight decrease
- 33% - significant decrease

c. Purchasing and Contracting:

- 33% - no impact
- 67% - moderate decrease

d. Receipts Control:

- 67% - no impact
- 33% - slight decrease

E. DATA ANALYSIS GROUPED BY HOSPITAL SIZE

For the third analysis, the respondents were grouped by the size of their respective to see if size was a factor in their responses. The respondents were grouped as follows:

- Group 1: Large Naval Hospital (n = 3)
- Group 2: Medium Naval Hospital (n = 6)
- Group 3: Small Naval Hospital (n = 4)

○Criterion 1: Endorsement of innovative programs by the Naval Hospital leadership.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group 2:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 75% - agree or strongly agree
- 25% - disagree or strongly disagree

○Criterion 2: A command-wide supply distribution system that is responsive to customer needs.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

●Group 2:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - neither agree nor disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 50% - agree or strongly agree
- 25% - neither agree nor disagree
- 25% - disagree or strongly disagree

○Criterion 3: There is a good working relationship between the contractor and Materials Management personnel.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group 2:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 17.5% - neither agree nor disagree
- 17.5% - disagree or strongly disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

○Criterion 4: The Materials Management department has a computerized information system capable of accessing workload reports of internal customers.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 33% - agree or strongly agree
- 67% - disagree or strongly disagree

●Group 2:

a. Applicable to Naval Hospitals:

- 67% - agree or strongly agree
- 17.5% - neither agree nor disagree
- 17.5% - disagree or strongly disagree

b. Currently present:

- 17.5% - agree or strongly agree
- 17.5% - neither agree nor disagree
- 67% - disagree or strongly disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 75% - agree or strongly agree
- 25% - disagree or strongly disagree

b. Currently present:

- 50% - agree or strongly agree
- 50% - disagree or strongly disagree

○Criterion 5: There is a computerized information system linking the Materials Management department with the Contractor.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group 2:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 83% - agree or strongly agree
- 17% - neither agree nor disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 75% - agree or strongly agree
- 25% - neither agree nor disagree

○Criterion 6: The Contractor is timely in providing required reports, regarding usage rates, cost and pricing data.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 67% - agree or strongly agree
- 33% - disagree or strongly disagree

●Group 2:

a. Applicable to Naval Hospitals:

- 50% - agree or strongly agree
- 50% - neither agree nor disagree

b. Currently present:

- 50% - agree or strongly agree
- 50% - neither agree nor disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 75% - agree or strongly agree
- 25% - neither agree nor disagree

b. Currently present:

- 50% - agree or strongly agree
- 50% - neither agree nor disagree

○Criterion 7: The Contractor is located close enough so that emergency orders can be delivered within 2 hours.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - disagree or strongly disagree

●Group 2:

a. Applicable to Naval Hospitals:

- 50% - agree or strongly agree
- 25% - neither agree nor disagree
- 25% - disagree or strongly disagree

b. Currently present:

- 17% - agree or strongly agree
- 83% - disagree or strongly disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 50% - agree or strongly agree
- 50% - disagree or strongly disagree

○Criterion 8: There is a system in place to monitor the Contractor's compliance with the terms of the contract.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group 2:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 83% - agree or strongly agree
- 17% - neither agree nor disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 50% - agree or strongly agree
- 25% - neither agree nor disagree
- 25% - disagree or strongly disagree

○Criterion 9: There is a backup/contingency system in place to accommodate breakdowns in the Contractor's delivery system.

●Group 1:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 100% - agree or strongly agree

●Group 2:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 66% - agree or strongly agree
- 17% - neither agree nor disagree
- 17% - disagree or strongly disagree

●Group 3:

a. Applicable to Naval Hospitals:

- 100% - agree or strongly agree

b. Currently present:

- 50% - agree or strongly agree
- 25% - neither agree nor disagree
- 25% - disagree or strongly disagree

○Criterion 10: If a stockless inventory program is implemented at your command, to what degree would implementation have on Full Time Equivalents (FTEs) within the Materials Management Department?

●Group 1:

a. Warehousing/Inventory Control:

- 34% - slight decrease
- 33% - moderate decrease
- 33% - significant decrease

b. Central Processing and Distribution:

- 34% - slight decrease
- 33% - moderate decrease
- 33% - significant decrease

c. Purchasing and Contracting:

- 67% - moderate decrease
- 33% - slight increase

d. Receipts Control:

- 67% - no impact
- 33% - slight increase

●Group 2:

a. Warehousing/Inventory Control:

- 40% - moderate decrease
- 60% - significant decrease

b. Central Processing and Distribution:

- 20% - no impact
- 20% - slight decrease
- 20% - moderate decrease
- 40% - significant decrease

c. Purchasing and Contracting:

- 20% - no impact
- 40% - slight decrease
- 40% - moderate decrease

d. Receipts Control:

- 60% - slight decrease
- 40% - moderate decrease

●Group 3:

a. Warehousing/Inventory Control:

- 25% - slight decrease
- 75% - significant decrease

b. Central Processing and Distribution:

- 25% - no impact
- 25% - slight decrease
- 50% - significant decrease

c. Purchasing and Contracting:

- 25% - no impact
- 25% - slight decrease
- 25% - moderate decrease
- 25% - significant decrease

d. Receipts Control:

- 25% - slight decrease
- 50% - significant decrease
- 25% - significant increase

F. CHAPTER SUMMARY

This chapter has presented the data collect during the structured interviews in different formats to asses the variability of the respondents perceptions and knowledge of the impact of implementing a stockless inventory program at their respective facilities.

IV. CRITERIA VALIDATION

A. CHAPTER INTRODUCTION

This chapter discusses the results of the analysis performed in Chapter III as it applies to CONUS-based Naval Hospitals and answers the research questions, 1) Is criteria used to implement stockless inventory systems at civilian hospitals applicable to Naval Hospitals? 2) Do Naval Hospitals currently meet the criteria for implementing a stockless inventory program? and, 3) What effect will a stockless inventory system have on personnel requirements within the Warehousing/Inventory Control, Central Processing and Distribution (CPD), Purchasing, and Receipts Control divisions of the Materials Management department?

B. APPLICABILITY OF THE CRITERIA TO NAVAL HOSPITALS

This section discusses the individual criterion as they apply to Naval Hospitals.

- Criterion 1: Endorsement of innovative programs by the Naval Hospital leadership.

One hundred percent of the respondents indicated that they either agree or strongly agree with this criterion as being applicable to Naval Hospitals. This would be expected since experience teaches us that without support from the leadership, whether, civilian sector or military, changes are going to be difficult if not impossible to implement.

- Criterion 2: A command-wide supply distribution system that is responsive to customers needs.

One hundred percent of the respondents indicated that they either agree or strongly agree with this criterion as being applicable to Naval Hospitals which is consistent with the literature. That is, if the supply distribution system is not meeting the customer's needs, then implementing a new program is not wise until the problems with the current system are identified and corrected.

- Criterion 3: There is a good working relationship between the contractor and Materials Management personnel.

One hundred percent of the respondents indicated that they either agree or strongly agree with this criterion as being applicable to Naval Hospitals. One of the reasons some companies have elected to implement a stockless inventory program is to build a relationship with one or a few suppliers. Close relationships built on trust and a mutual commitment to succeed will increase the probability of success.

- Criterion 4: The Materials Management Department has a computerized information system capable of accessing workload reports of internal customers.

Seventy-seven percent of the respondents agree or strongly agree that this criterion is applicable to Naval Hospitals. Another eight percent neither agree nor disagree and the remaining fifteen percent disagree or strongly disagree. Of those who disagree, one respondent is from a medium size hospital and one respondent is from a small size hospital. The Materials Management Department needs access to workload reports to generate profile studies workload (i.e., patients seen/admitted) versus supply

consumption. Access to the Medical Expense Performance Reporting system (MEPRS) may be adequate for some and therefore they do not feel a need for a more robust system.

- Criterion 5: There is a computerized information system linking the Materials Management Department with the contractor.

One hundred percent of the respondents indicated that they either agree or strongly agree with this criterion as being applicable to Naval Hospitals. The one major benefit for implementing a stockless inventory program is to streamline the order and payment processing systems. Although the Contractor's employees are primarily responsible for the inventory functions, Materials Management personnel still need a mechanism to access current usage rates and demand histories as well as being able to place emergency orders online.

- Criterion 6: The Contractor is timely in providing required reports regarding usage rates, cost and pricing data.

Seventy-seven percent of the respondents either agree or strongly agree that this criterion is applicable to Naval Hospitals. The other 23 percent neither agree nor disagree with the criterion are represented by two respondents from medium size hospitals and one respondent from a small size hospital. A hospital has to know what its usage rates, costs and pricing histories are to be able to prepare budget requests and forecast future expenses.

- Criterion 7: The Contractor is located close enough so that emergency orders can be delivered within 2 hours.

Eighty-five percent of the respondents indicated that this criterion is applicable to Naval Hospitals. One respondent from a small hospital percent neither agrees nor

disagrees and one respondent from a medium size hospital disagrees. While the author will concede that it is not absolutely necessary for the contractor to be located within 2 hours, the longer the Contractor has to respond the greater the hospital's backup/contingency stock has to be.

- Criterion 8: There is a system in place to monitor the Contractor's compliance with the terms of the contract.

One hundred percent of the respondents indicated that they either agree or strongly agree with this criterion as being applicable to Naval Hospitals. And for obvious reasons, this is just good business practice.

- Criterion 9: There is a backup/contingency system in place to accommodate breakdowns in the Contractor's delivery system.

One hundred percent of the respondents indicated that they either agree or strongly agree with this criterion as being applicable to Naval Hospitals. Hospitals can never be truly stockless because no one can forecast or stock 100 percent of the supplies need to handle every conceivable patient who enters the hospital. Nor can one predict when mass trauma patients will arrive at the hospital depleting routine stock within minutes or hours. Therefore, all hospitals should maintain backup/contingency supplies for emergencies.

C. STATUS OF THE NAVAL HOSPITALS WITH RESPECT TO THE CRITERIA

This section discusses the criteria in the context of whether or not the hospital is currently ready to implement a stockless inventory program.

- Criterion 1: Endorsement of innovative programs by the Naval Hospital leadership.

Ninety-two percent of the respondents indicated that they either agree or strongly agree that the leadership at their respective Naval Hospitals generally endorse innovative programs. Only one respondent from a small hospital indicated his current leadership does not support implementation of innovative programs.

- Criterion 2: A command-wide supply distribution system that is responsive to customer's needs.

Sixty-two percent of the respondents agree or strongly agree that the supply distribution at their current command meets their customers needs. Another 23 percent neither agree nor disagree and the remaining 15 percent disagree or strongly disagree. Of those 15 percent who indicate that their supply distribution system does not meet their customer's needs, one respondent was from each hospital group (i.e., large, medium and small).

- Criterion 3: There is a good working relationship between the contractor and Materials Management personnel.

Eighty-five percent of the respondents indicated that they have good working relationships between the Contractor and Materials Management personnel. As stated previously, relationships between suppliers and customers need to be strong, positive and continually nurtured. One respondent who neither agrees nor disagrees and one respondent who indicates a good working relationship between the contractor and Materials Management does not exist, represent the remaining 15 percent of the population. Both of these respondents are from small hospitals.

- Criterion 4: The Materials Management Department has a computerized information system capable of accessing workload reports of internal customers.

Sixty-one percent of the respondents indicated that the Materials Management Department did have a computerized system capable of accessing workload reports of internal customers. This is probably based on the Military Expense and Personnel Reporting System used through DoD hospitals. Although it would be preferable to access the information online, Materials Management personnel have access to printed reports and can request these through their Management Information Department. Of those who responded negatively, one was from a large hospital, one was from a medium hospital and four were from small hospitals.

- Criterion 5: There is a computerized information system linking the Materials Management Department with the contractor.

Eighty-five percent of the respondents indicated that they either agree or strongly agree that they have a computerized system linking the Materials Management Department with their current prime vendor contractor(s). One respondent from a medium hospital and one respondent from a small hospital represent the remaining 15 percent, who neither agree nor disagree. This may indicate the system provided by the Contractor is located in a different department (I.e., the Pharmacy) as is the case with some small hospitals.

- Criterion 6: The Contractor is timely in providing required reports regarding usage rates, cost and pricing data.

Seventy-seven percent responded that they did receive timely reports. Two respondents from medium hospitals and one respondent from a small hospital represent

the other 23 percent, who neither agree nor disagree. Since these responses are based on the current Prime Vendor contract, closer monitoring and stronger requests should be made of the Contractors who are not in compliance.

- Criterion 7: The Contractor is located close enough so that emergency orders can be delivered within 2 hours.

Sixty-two percent of the respondents answered that they disagreed or strongly disagreed that their current prime vendor contractor(s) are located within 2 hours of their respective Naval Hospitals and include one large, four medium and three small hospitals. This is probably a result of the fact that the Prime vendors are awarded contracts for specific geographic areas and generally have a central distribution point. However, as stated previously, not meeting this one criteria will not prohibit a hospital from implementing a stockless inventory program.

- Criterion 8: There is a system in place to monitor the Contractor's compliance with the terms of the contract.

Seventy-seven percent of the respondents indicated that there is a system in place to monitor the Contractor's compliance with the terms of the contract. One respondent from a small hospital indicates that there is no system to monitor the Contractor's compliance, However, this contract is centrally managed by the Defense Personnel Support Center in Philadelphia, Pennsylvania, and there are procedures for reporting non-compliance in place. Two respondents neither agree nor disagree this criterion.

- Criterion 9: There is a backup/contingency system in place to accommodate breakdowns in the Contractor's delivery system.

Only 69 percent of the of the respondents answered that there is a backup/contingency system in place. Of the remaining 31 percent, two respondents (one with two years experience and one with seven years experience) neither agree nor disagree and two respondents (one with seven years and one with nine years of experience) indicate a backup/contingency system is not in place. Which is surprising because the standard of practice in both the civilian and military sectors is to have a backup/contingency stock of supplies on hand.

D. IMPACT OF A STOCKLESS INVENTORY PROGRAM ON PERSONNEL

This section discusses the respondents' estimates on reductions in FTEs at their respective Naval Hospitals.

- Warehouse/Inventory Control Division

All respondents answered that there would be some reduction if FTEs in the Warehouse/Inventory Control division. Fifty percent felt there would be significant reductions (greater than 20 percent) and the other 50 percent felt their would be 1 - 20 percent reductions.

- Central Processing and Distribution Division

Eighty percent of the respondents answered that there would be some reduction if FTEs in the Warehouse/Inventory Control Division. Thirty percent felt there would be significant reductions and 50 percent felt their would be 1 - 20 percent reductions. Twenty percent answered that there would be no impact in this Division.

●Purchasing and Contracting Division

Seventy percent of the respondents answered that there would be some reduction if FTEs in the Warehouse/Inventory Control division. Forty percent felt there would be significant reductions and 30 percent felt there would be 10 - 20 percent reductions. Twenty percent answered there would be no impact and 10 percent answered there would be a slight increase (1 - 10 percent) in personnel.

●Receipts Control Division

One hundred percent of the respondents in Group A, 71 percent of the respondents in Group B and 33 percent of the respondents in Group C (representing 67 percent of the total population) indicated that there would be decreases in the FTEs in this Division and 17 percent indicated that a stockless inventory system would have no impact on personnel in this area. This is inconsistent with the research which shows that in the areas performing invoice validation there will be a significant increase in the number of invoices received which will necessitate an increase in FTEs (see Table 3.1). Only 16 percent of the respondents indicated that there would be increases in FTEs in this division. The size of the hospital nor the experience level seemed to influence these responses in either direction.

E. ANSWERS TO RESEARCH QUESTIONS

1. "Is the criteria used to implement stockless inventory systems at civilian hospitals applicable to navy Naval Hospitals?"

The structured interviews with experienced medical Material Managers who are currently filling positions as Department Heads of the Material Management Departments

in CONUS-based Naval Hospitals, tend to validate the criteria presented in Chapter II. All respondents agreed 100 percent with six of the criteria and the remaining three were deemed applicable by at least 77 percent of the respondents. Size of hospital nor experience level does not seem to be a significant factor in the negative responses.

2. "Do Naval Hospitals currently meet the criteria for implementing a stockless inventory program?"

Based on the interviews, Naval Hospitals currently meet approximately sixty-six percent of the criteria identified for implementing a stockless inventory program at their respective hospitals. The major deficiencies are with criteria 4, 6 and 7. Contractor providing reports (criterion 6) and distance from the Contractor (criterion 7) can be overcome at the individual hospital level. The third, criterion 4, is beyond the control of the individual hospital and can also be overcome with cooperation from the internal customers and the Management Information Department.

3. "What effect will a stockless inventory system have on personnel requirements within the Warehousing/Inventory Control, Central Processing and Distribution, and receipts Control divisions of the Materials Management Department?"

Essentially, the respondents agree that there should be a reduction in FTEs within the divisions listed in the above question. However, as previously stated, the research indicates there should be an increase in areas involved in invoice validation due to the increase in invoices. In addition, depending on the size of the Purchasing and Contracting divisions, there may not be a decrease and this is primarily due to the fact the vendor providing the stockless inventory service, can not be expected to provide 100

percent of the items needed by the hospital. Therefore, the Purchasing and Contracting division may not see a decrease in the number of purchase requests they process. This is especially true at Naval Hospitals where the PVP is in place.

F. CHAPTER SUMMARY

In this chapter, the criteria listed in chapter II has been validated, impact on personnel within the Materials Management Department has been explored and the three research questions have been answered.

V. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSION

As indicated in Table 5.1, the central conclusion to this thesis is that the criteria used by civilian hospitals for implementing stockless inventory systems is valid for use by Naval Hospitals. However, the perceptions of the Material Managers interviewed, indicate there are some targets of opportunity for education and reengineering of the Materials Management Departments.

Table 5.1

CRITERION	APPLICABLE	PRESENT
1	100	92
2	100	62
3	100	85
4	77	31
5	100	85
6	77	54
7	85	38
8	100	77
9	100	69
AVERAGE	93.22	65.89

Another conclusion is that a Stockless inventory program will provide benefits to the navy Medical Department by reducing FTEs in the Materials Management Department or redistributing those FTEs within the Materials Management Department or to other areas within the Naval Hospital where they can be better utilized. In addition, a

stockless inventory program will reduce the requirement for medical personnel in the patient care areas who currently perform inventory and ordering duties so that they can be reassigned to providing direct patient care. In addition, a stockless inventory program can further reduce unofficial inventories located in the patient care departments within the Naval Hospital thereby freeing-up funds for more immediate use.

A final conclusion is that with a stockless inventory program in place, and given current deployment policies, some of the disruption caused by large scale mobilization at the individual Navy Hospitals will be eliminated. That is, the Contractor will still be providing a service that is uninterrupted by the mobilization.

B. RECOMMENDATIONS

Prior to implementing a stockless inventory programs the following recommendations are proposed.

First, Material Managers need to familiarize themselves with programs implemented by civilian hospitals and thoroughly review the impact the program has on personnel within the Materials Management Department.

Second, a thorough feasibility study should be conducted by individual Naval Hospitals to include, a review of current materials management service, organization, operations and methods, and complete cost performance. However, identifying the current scenario is not enough. The Naval Hospital must also assess how much improvement can be achieved in all facets of materials management without a stockless program. This study should also include suppliers who are available, willing, and able to

provide such services, ensuring that adequate alternatives are available should a program be tried and fails. [Kowalski-Dickow, 1993, p. 231]

The final recommendation for this thesis is the Naval Hospital needs to ensure that a stockless inventory program provides the lowest total delivered cost. In addition, if the analysis shows that the stockless program will eliminate several FTEs in the Materials Management Department, a further study should be done to determine how many FTEs could be eliminated if efficiency were improved in other ways.

LIST OF REFERENCES

Capano, Anthony M., "*THE EFFECTS OF THE DEPARTMENT OF DEFENSE'S PRIME VENDOR PROGRAM ON NAVY MEDICAL READINESS*", a Master's Thesis, Naval Postgraduate School, Monterey, California, December 1994

Kowalski-Dickow Associates, Inc., in cooperation with the American Society for Healthcare Material Managers, *MANAGING HOSPITAL MATERIALS MANAGEMENT*, American Hospital Publishing, Inc., 1993

Kowalski, Jamie C., *MATERIALS MANAGEMENT POLICY AND PROCEDURES MANUAL*, 2nd Ed., The Catholic Health Association of the United States, 1990

Martin, Charles, Bureau of Medicine and Surgery, *CONFERENCE FOR PROVIDERS OF MANAGED CARE*, Georgetown University brief, 21 August 95

Prager, Jonus, *CONTRACTING OUT GOVERNMENT SERVICES: LESSONS LEARNED FROM THE PRIVATE SECTOR*, Public Administration Review, March/April 1994, Vol. 54, N2

Taylor, Kathryn S., *CHANGING COURSE- REALIGNING THE SUPPLY CHAIN: PROVIDERS AND SUPPLIERS SHARE RISKS, REWARDS*, Hospitals and Health Networks, April 20, 1994

APPENDIX. STRUCTURED INTERVIEW EXAMPLE

If a stockless inventory program is implemented at your activity, which of the following criteria would you consider to be applicable to Naval Hospitals, and to what degree are they currently present your facility. Note: For questions referring to the "Contractor" please consider the current Prime Vendor contract(s) you are using when answering.

Please use the following scale:

1 = Strongly disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly agree

1. Endorsement of innovative programs by the Naval Hospital leadership.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

2. A command-wide supply distribution system that is responsive to customer needs.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

3. There is a good working relationship between the contractor and Materials Management personnel.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

4. The Materials Management department has a computerized information system capable of accessing workload reports of internal customers.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

5. There is a computerized information system linking the Materials Management department with the Contractor.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

6. The Contractor is timely in providing required reports, regarding usage rates, cost and pricing data.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

7. The Contractor is located close enough so that emergency orders can be delivered within 2 hours.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

8. There is a system in place to monitor the Contractor's compliance with the terms of the contract.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

9. There is a backup/contingency system in place to accommodate breakdowns in the Contractor's delivery system.

a. Applicable to Naval Hospitals: 1 2 3 4 5

b. Currently present: 1 2 3 4 5

If a stockless inventory program is implemented at your command, to what degree would implementation have on Full Time Equivalents (FTEs) within the Materials Management Department? (Note: It is understood that this is an estimate.)

Please use the following scale:

- | | |
|--|----------------------------------|
| 1 = No impact on FTEs | 5 = Slight increase (< 10%) |
| 2 = Slight decrease in FTEs (< 10%) | 6 = Moderate increase (10 - 20%) |
| 3 = Moderate decrease in FTEs (10 - 20%) | 7 = Significant increase (>20%) |
| 4 = Significant decrease in FTEs (> 20%) | |

a. Warehousing/Inventory Control:

☐

b. Central Processing and Distribution:

☐

c. Purchasing and Contracting:

☐

d. Receipts Control:

☐

Years of experience in the Materials Management/Logistics field: _____

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